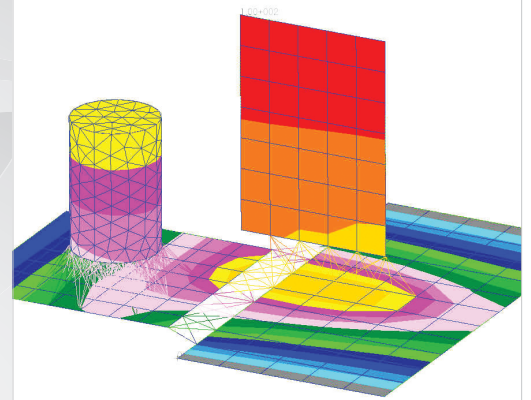


MSC Sinda for Patran

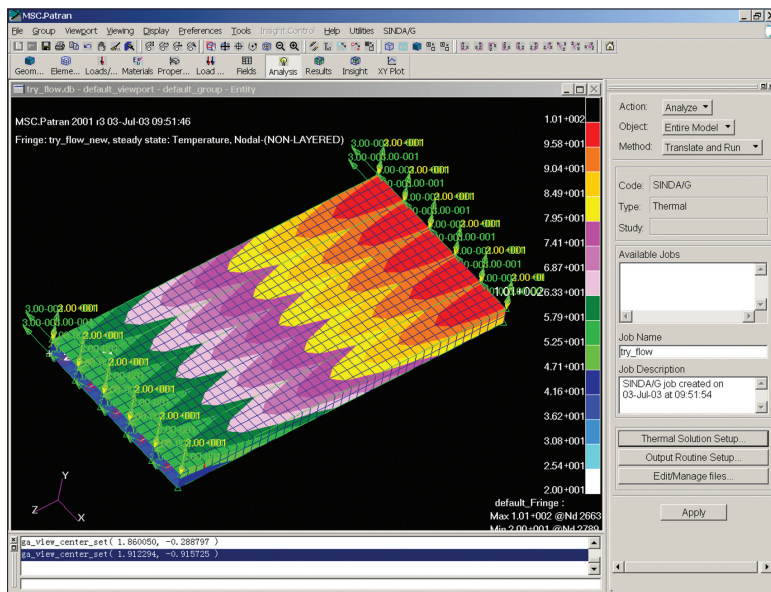
Advanced Thermal Modeling



Overview

MSC Sinda for Patran fully integrates Sinda with Patran. It combines all Sinda's strengths and advantages as a worldclass advanced thermal analyzer with the full power and user-friendly environment of Patran, the world renowned FEM pre and post processor. Sinda for Patran supports thermal radiation and orbital heating using industry standard programs such as THERMICA, NEVADA, and TRASYS. Users can freely switch from one radiation code to another without any changes to the model, thus eliminating concerns about product compatibility and model obsolescence.

This system employs a revolutionary radiation super element concept and true geometric primitives that are passed to thermal radiation codes. With industry proven efficient solver technology, users can simulate complex thermal models that may include conduction, convection, advection and radiation along with thermal contact. Sinda for Patran allows Sinda advanced thermal features, such as convection equations, programming logic or entire subroutines to be easily incorporated in the Patran generated model. In addition, advanced thermal features such as heat pipes (VCHP's) or Thermal Electric Devices (TED's) can be added to a model built in Patran.



Capabilities

- Model Preprocessing
 - Comprehensive CAD integration allowing model import from major CAD packages
 - Extensive automatic and quality meshing capabilities
 - Support for material, property, loads and boundary condition definitions
- Analysis
 - Advanced linear and nonlinear thermal analysis capabilities to solve large, complex models efficiently
 - Support for thermal contact
 - Ability to switch between major industry radiation codes for effective radiation analysis
- Results Postprocessing
 - Advanced visualization techniques to gain better insight into the system's thermal behavior
- Open Architecture
 - Customization of the graphical user interface and analysis process

Benefits

- Improved productivity through faster preprocessing and accurate analysis and efficient post-processing
- Improved designs by understanding product behavior in various operating environments
- Low cost access to the power of integrated world-class computer aided engineering solution

Sinda for Patran can be used to solve a broad range of complex applications spanning multiple industries, including:

- Electronic equipment from discrete devices to complete packages
- Silicon wafer processing equipment
- Engine components on automobiles
- Heating and A/C equipment on automobiles
- Heat loss from buildings
- Solar heating panels
- Consumer small and large appliances
- Jet engines
- Electronics/avionics
- Satellites/Reentry vehicles
- Thermal-Hydraulics

Analysis Capabilities

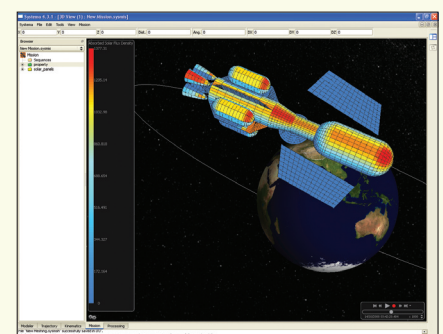
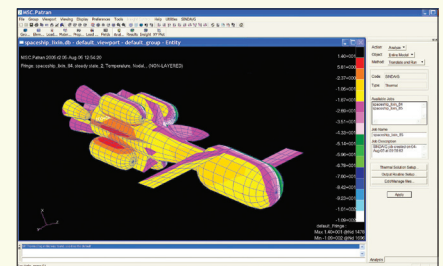
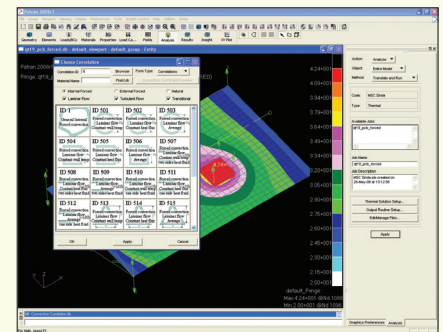
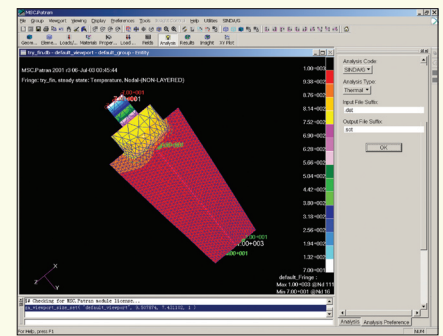
- Conduction
- Convection
- Radiation
- Steady state solution
- Transient heat transfer solution
- Radiation super elements
- Geometric primitives utilizing “true geometric shapes” for radiation
- 44 industry-standard convection correlations
- Internal/external convection and natural convection
- Orbital heating
- Thermal contact
- Coupled advection

Modeling Capabilities of Patran

MSC TFEA allows access to all the powerful preprocessing capabilities of Patran including optional access to data from several CAD systems. Key features include:

- Standard geometry access from
 - Parasolid
 - STEP 203 and 209
 - IGES
 - VDA
 - I-DEAS
 - STL
- Optional CAD access formats
 - ACIS
 - Pro/Engineer
 - Unigraphics NX
 - CATDirect_v4
 - CATDirect_V5

- Loads
 - Advanced thermal loads for heat flux, convection and radiation
- Materials
 - Isotropic
 - 2D/3D orthotropic and anisotropic
 - Composite
 - Coating and MLL materials
 - Basic fluid and advanced fluid materials
 - Material lib and convection correlation wizard
- Properties
 - 1D element – Team, rod, conductor, flow tube
 - 2D element – Tri or quad, shell or plate, axisymmetric solid
 - 3D element – Solid tet, wedge, or hex
- Fields
 - Spatial dependency
 - Temperature dependent
 - Time dependency
- Post-processing
 - Scalar and vector plots
 - Graphical display of results
 - XY plots
 - Contact visualizer
- Orbital Heating/Thermal Radiation links
 - THERMICA
 - TRASYS
 - NEVADA
 - TSS
 - SindaRad



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